

POSITIONS AND AREAS OF SUN SPOTS—Continued

PROVISIONAL SUN-SPOT RELATIVE NUMBERS,
APRIL 1935

Date	Eastern stand-ard time	Heliographic			Area		Total Area for each day	Observatory
		Diff. in longitude	Longi-tude	Latitu-de	Spot	Group		
Apr. 20.....	10 50	+60.5	215.9	-35.0	147		147	Do.
Apr. 21.....	13 15	-54.0	86.9	-36.0		3	286	Mt. Wilson.
Apr. 22.....	13 9	+78.0	216.0	-35.0	283			U. S. Naval.
Apr. 23.....	10 56	-59.0	56.7	-21.5	10		10	Do.
Apr. 24.....	11 18	-45.0	57.3	-20.5	8		8	Do.
Apr. 25.....	11 30	(1)	(1)	(1)				Do.
Apr. 26.....	11 0	(1)	(1)	(1)				Do.
Apr. 27.....	11 17	(1)	(1)	(1)				Do.
Apr. 28.....	13 38	(1)	(1)	(1)				Do.
Apr. 29.....	10 14	-71.5	325.3	-25.5		73	73	Harvard.
Apr. 30.....	11 9	-70.0	313.1	+23.0	69		31	U. S. Naval.
		-57.5	325.6	-22.5			100	

^a No spots.

NOTE.—Mean daily area for April, 78.

(Data dependent alone on observations at Zurich and its station at Arosa)
[Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

April 1935	Relative numbers	April 1935	Relative numbers	April 1935	Relative numbers
1	0	11		16	15
2	0	12		Ec 22	16
3	0	13		34	9
4	7	14		30	7
5	0	15		b 37	8
6	0	16		29?	0
7	0	17		27	0
8		Mc 11	18	20	0
9	a 24	19		11	d 8
10	22	20		16	d 16

Mean, 29 days=12.3.

a=Passage of an average-sized group through the central meridian.

b=Passage of a large group or spot through the central meridian.

c>New formation of a center of activity; E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.

d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

{Aerological Division, D. M. LITTLE, in Charge}

By L. T. SAMUELS

normal over the northeastern part of the country, with resultant velocities normal at all stations.

At 3,000 meters, the directions were generally close to normal, except at a few stations in the northeast and on the Pacific coast where northerly components predominated. Velocities were mostly above normal, except over the Great Lakes region and the extreme northwest.

At 5,000 meters, the directions were generally close to normal, except at a few more northern stations where northerly components were predominant, and on the California coast where greater southerly components prevailed. Velocities were close to normal except at San Diego and Salt Lake City, where large positive departures occurred, and at Cheyenne and Chicago, where large negative departures occurred.

At those stations which have a sufficient period of record to determine approximate normals, free-air temperatures during April averaged below normal, except at Pensacola and in the higher levels at San Diego, Omaha, and Norfolk. (See table 1.) Mean temperatures for April at Seattle and Spokane were higher than those at Boston below 3,000 meters, but above this level the temperatures at Boston averaged higher.

Free-air relative humidities averaged above normal at all stations except Boston, with the largest departures occurring at Norfolk. Mean free-air relative humidities for April were high in the upper levels over Murfreesboro compared to surrounding stations.

The directions of the resultant winds for the month at 1,000 meters contained greater northerly components than

TABLE 1.—Mean free-air temperatures and relative humidities obtained by airplanes during April 1935
TEMPERATURE (° C)

Stations	Altitude (meters) m. s. l.												Number of obser-vations						
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	Mean	Depart- ture from normal	
Billings, Mont. ¹ (1088 m).....	-0.3								0.1		-2.9		-6.1		-12.7		-19.2		29
Boston, Mass. ² (6 m).....	5.9	-1.1	3.9	-0.4	1.3	-1.1	-1.2	-2.0	-3.3	-2.0	-5.3	-1.8	-7.1	-1.3	-11.3	-0.6	-17.6	-0.7	16
Cheyenne, Wyo. ¹ (1873 m).....	0.1								1.1		1.3		-1.8		-8.2		-15.2		28
Fargo, N. Dak. ¹ (274 m).....	1.1		1.9		1.2		-1.1		-3.1		-5.2		-7.5		-12.4		-18.4		30
Kelly Field (San Antonio), Tex. ³ (206 m).....	17.3		17.9		17.2		16.3		14.3		11.6		8.0		0.7		-6.2		28
Lakehurst, N. J. ⁴ (3 m).....	5.3		5.8		3.9		1.6		-0.5		-2.8		-4.9		-9.2		-14.2		22
Maxwell Field (Montgomery), Ala. ¹ (52 m).....	15.6		16.8		14.5		11.5		9.0		6.6		3.4		-2.9		-9.7		25
Mitchel Field (Hempstead, L. I.), N. Y. ³ (29 m).....	6.1		6.2		3.9		1.8		-0.3		-2.6		-4.8		-10.1		-16.2		26
Murfreesboro, Tenn. ¹ (174 m).....	11.0		12.0		10.7		8.3		6.1		3.6		1.1		-4.9		-11.6		30
Norfolk, Va. ⁴ (10 m).....	11.2	-0.6	10.9	-0.5	9.2	-0.1	6.8	-0.1	4.6	+0.1	2.2	+0.2	-0.4	+0.3	-5.5	+0.4	-11.1	+0.4	21
Oklahoma City, Okla. ¹ (391 m).....	10.8		10.9		10.6		10.7		8.9		5.9		2.3		-5.2		-13.0		29
Omaha, Nebr. ¹ (300 m).....	5.9	-1.0	6.4	-1.2	5.8	-1.5	4.4	-1.1	2.9	-0.4	0.9	+0.1	-2.0	0.0	-8.2	+0.1	-15.0	+0.4	30
Pearl Harbor, Territory of Hawaii ⁴ (6 m).....	18.8	+0.8	17.4	+0.8	16.1	+1.4	14.4	+1.8	12.6	+2.1	10.2	+2.3	7.9	+2.7	2.0	+3.3	-4.4	+3.5	25
Pensacola, Fla. ⁴ (24 m).....	13.1	-2.9	12.2	-1.2	11.7	-0.8	10.2	-0.5	8.3	-0.5	4.7	+0.3	4.7	+1.2	-0.1	+1.9	-7.3	+1.9	30
Scott Field (Belleville), Ill. ¹ (135 m).....	7.0		9.6		7.4		6.0		4.7		2.8		0.4		-5.5		-12.2		23
Seattle, Wash. ⁴ (25 m).....	4.6	-5.0	5.4	-2.6	3.5	-2.0	0.6	-2.1	-2.3	-2.1	-5.0	-2.2	-7.5	-2.1	-12.8	-1.9	-19.4	-1.9	30
Selridge Field (Mount Clemens), Mich. ³ (177 m).....	3.0		4.6		2.3		0.5		-0.9		-2.3		-4.6		-10.0		-16.5		29
Spokane, Wash. ⁴ (596 m).....	5.0		3.6		3.6		1.3		-1.8		-5.0		-8.0		-13.6		-20.1		30
Sunnyvale, Calif. ⁴ (10 m).....	12.6	-1.7	10.8	-0.7	9.3	-1.0	7.1	-1.5	4.8	-1.7	2.1	-1.7	-1.0	-1.5	-6.9	-1.1	-13.3	-1.1	26
Washington, D. C. ⁴ (13 m).....	9.1	-1.6	8.9	+0.1	5.6	-1.0	3.8	-1.1	2.0	-1.2	0.1	-1.7	-2.4	-2.7	-7.2	-2.5	-13.3	-2.5	23
Wright Field (Dayton), Ohio ³ (244 m).....	5.7		7.1		6.3		4.2		2.2		0.3		-1.8		-6.9		-13.1		26

TABLE 1.—Mean free-air temperatures and relative humidities obtained by airplanes during April 1935—Continued
RELATIVE HUMIDITY (PERCENT)

Stations	Altitude (meters) m. s. l.																Number of observations	
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000			
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal		
Billings, Mont.	74						60		56		59		62		57		51	
Boston, Mass.	67	-3	63	-4	62	-2	58	-3	62	0	62	0	60	0	62	-2	49	
Cheyenne, Wyo.	71						69		68		57		56		55		54	
Fargo, N. Dak.	82		77				68		66		63		60		52		46	
Kelly Field (San Antonio), Tex.	87		78				68		51		42		37		38		36	
Lakehurst, N. J.	86		70				71		72		72		68		51		45	
Maxwell Field (Montgomery) Ala.	83		67				65		64		56		46		35		29	
Mitchel Field (Flushing, L. I.), N. Y.	75		68				65		65		64		59		58		51	
Murfreesboro, Tenn.	87		80				76		73		71		68		65		52	
Norfolk, Va.	78	+10	67	+8	66	+11	65	+12	66	+15	64	+14	58	+10	48	+10	42	
Oklahoma City, Okla.	73		70				60		45		40		37		40		41	
Omaha, Nebr.	75	+3	71	+2	65	+3	62	+4	57	+2	55	+1	55	+3	56	+6	53	
Pearl Harbor, Territory of Hawaii	82	+3	77	+6	69	+5	62	+5	54	+4	51	+4	43	+1	34	-3	35	
Pensacola, Fla.	82	+17	81	+7	68	+7	58	+8	53	+12	43	+8	38	+8	29	+6	27	
San Diego, Calif.	88						58		53		48		41		39		37	
Scott Field (Belleville), Ill.	82		59				60		66		63		60		57		50	
Seattle, Wash.	82	+10	73	+4	69	+3	66	+3	63	+3	60	+2	57	+1	50	0	49	
Selfridge Field (Mount Clemens), Mich.	78		67				67		64		56		53		52		37	
Spokane, Wash.	66						63		61		62		65		64		51	
Sunnyvale, Calif.	80	+9	75	+3	67	+4	62	+7	57	+9	54	+10	51	+10	47	+10	43	
Washington, D. C.	74	+9	66	+5	68	+9	68	+9	62	+4	58	+3	56	+4	50	+1	46	
Wright Field (Dayton), Ohio.	82		75				71		69		68		62		56		42	

Observations taken about 5 a. m., 75th meridian time, except along the Pacific coast and Hawaii where they are taken at dawn.

NOTE.—The departures are based on "normals" covering the following total number of observations made during the same month in previous years, including the current year: Boston, 71; Norfolk, 121; Omaha, 119; Pensacola, 163; San Diego, 146; Seattle, 69; Sunnyvale, 57; Washington, 200.

TABLE 2.—Free-air resultant winds (meters per second) based on pilot-balloon observations made near 6 a. m. (E. S. T.) during April 1935

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m.)	Atlanta, Ga. (309 m.)	Billings, Mont. (1,038 m.)	Boston, Mass. (15 m.)	Cheyenne, Wyo. (1,873 m.)	Chicago, Ill. (192 m.)	Cincinnati, Ohio (153 m.)	Detroit, Mich. (204 m.)	Fargo, N. Dak. (274 m.)	Houston, Tex. (21 m.)	Key West, Fla. (11 m.)	Medford, Oreg. (410 m.)	Murfreesboro, Tenn. (180 m.)					
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity		
Surface	319	1.2	292	1.6	318	2.2	353	2.2	269	2.4	24	1.9	330	1.1	23	1.7	94	1.5
500	284	4.0	338	5.1	340	5.0	32	2.9	6	0.3	55	3.6	128	3.5	150	3.9	150	2.2
1,000	291	5.8	297	6.0	279	1.7	324	6.5	10	2.8	288	2.8	54	3.1	167	2.8	214	2.2
1,500	273	3.1	297	6.7	250	2.3	306	9.3	261	3.7	311	5.4	282	7.7	330	4.0	263	2.5
2,000	271	5.2	293	8.8	257	3.9	304	10.5	266	6.9	301	6.0	297	7.4	340	2.7	316	6.6
2,500	271	6.9	283	9.7	280	6.1	310	13.3	281	9.8	298	7.4	312	7.1	323	2.5	308	8.3
3,000	272	10.2	267	10.0	276	6.1	288	13.4	281	11.1	295	6.2	312	6.7	306	11.7	289	4.0
4,000	266	8.7	270	11.0	266	5.9	270	15.0	306	3.6	275	5.6	304	9.1	313	10.8	296	4.3
5,000																		

Altitude (m) m. s. l.	Newark, N. J. (14 m.)	Oakland, Calif. (8 m.)	Oklahoma City, Okla. (402 m.)	Omaha, Neb. (306 m.)	Pearl Harbor, Territory of Hawaii ¹ (68 m.)	Pensacola, Fla. (24 m.)	St. Louis, Mo. (170 m.)	Salt Lake City, Utah (1,294 m.)	San Diego, Calif. (15 m.)	Sault Ste. Marie, Mich. (198 m.)	Seattle, Wash. (14 m.)	Spokane, Wash. (603 m.)	Washington, D. C. (10 m.)					
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity		
Surface	324	1.8	144	1.0	49	1.1	38	1.4	290	0.7	97	0.6	154	3.0	292	0.3	37	1.5
500	337	6.3	277	2.0	146	1.7	90	1.5	263	2.6	155	1.1	306	1.9	69	4.5	198	1.3
1,000	322	6.9	317	1.8	204	3.9	224	3.0	243	4.2	286	1.6	313	2.1	58	3.6	204	1.6
1,500	302	8.2	307	1.8	246	3.5	282	2.5	265	5.5	306	4.8	167	4.6	298	2.3	196	1.7
2,000	302	11.0	320	2.5	262	4.5	288	3.7	280	7.1	309	7.3	197	3.8	284	3.7	10	4.1
2,500	313	10.7	328	3.4	301	6.6	271	5.3	292	7.1	312	7.4	248	4.2	283	4.4	8	4.3
3,000	334	13.3	309	4.4	291	9.4	277	7.8	286	10.0	321	8.4	266	5.1	261	4.8	349	4.7
4,000	338	12.0	288	2.5	338	15.0	315	9.0	287	6.6	201	12.0	271	8.9	286	8.0	354	5.3
5,000																		

¹ Navy stations.